

**TOOTHBRUSH BRISTLE DISK****RELATED APPLICATION**

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This application claims priority in U.S. Provisional Application Ser. No. 60/261,452, filed January 12, 2001, the disclosure of which is incorporated herein by reference.

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**BACKGROUND OF THE INVENTION****1. Field of the Invention**

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The present invention relates to toothbrush bristle disks. More particularly, the present invention relates to a toothbrush bristle disk adapted for rotation by a rotary electric toothbrush. The bristle disk of the present invention includes a novel arrangement of bristles and tufts effective to clean the teeth and gums of a user when rotated by an electric toothbrush.

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## 2. Description of the Prior Art

U.S. Patent No. 3,848,336 to Copelan provides electric toothbrushes that rotate a bristle disk or brush about an axis parallel to the longitudinal axis of the bristles. U.S. Patent No. 5,577,285 to Drossler assigned on its face to Braun Aktiengesellschaft provides electric toothbrushes that have been made to move the brush in an oscillatory motion.

However, there is a need for an improvement to the bristle disks used with such rotary electric toothbrushes. The present invention relates to such an improved bristle disk. Namely, the present invention provides a bristle disk adapted to simultaneously clean the gingival space between the teeth and gums, the surface of the teeth, and the interproximal space between the teeth by such electric toothbrushes.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a bristle disk.

It is another object of the present invention to provide a bristle disk having three rows of tufts.

It is a further object of the present invention to provide  
5 a bristle disk having an outer row, a middle row and an inner row of tufts.

It is a still further object of the present invention to  
provide a bristle disk having an outer row of tufts adapted for  
10 cleaning the gingival space between the teeth and gums, a middle row of tufts adapted for cleaning the surface of the teeth, and an inner row of tufts adapted for cleaning the interproximal space between the teeth.

15 These and other objects and advantages of the present invention are achieved by a bristle disk for an electric toothbrush having a bristle carrier and at least three groups of tufts extending from the bristle carrier with each of the tufts having one or more bristles. Some of the tufts being a first  
20 group of tufts disposed in an outer row. Others of the tufts being a second group of tufts disposed in a middle row. Still others of the tufts being a third group of tufts disposed in an inner row. The tufts of the outer row having a height and shape

adapted for cleaning the gingival space between teeth and gums.  
The tufts of the middle row having a height and shape adapted  
for cleaning the surface of the teeth. The inner row having at  
least one tuft with a height and shape adapted for cleaning the  
5 interproximal space between the teeth.

Preferably, the first group of tufts are of the same  
height, the second group of tufts alternate between tufts with  
bristles of the same height and tufts with bristles of differing  
10 height wherein the tufts with bristles of differing height form  
an inward incline, and the third group of tufts are located  
about at a center point of the bristle carrier and have bristles  
with differing height that form a point.

#### DESCRIPTION OF THE DRAWINGS

Fig. 1 is a top view of a bristle disk for rotary electric  
toothbrushes of the present invention;

Fig. 2 is a side view of the bristle disk of Fig. 1;

Fig. 3 is a sectional view of the bristle disk of Fig. 1 taken along line 3-3 of Fig. 1;

Fig. 4 is a sectional view of the bristle disk of Fig. 1  
5 taken along line 4-4 of Fig. 1;

Fig. 5 is a sectional view of the bristle disk of Fig. 1 taken along line 5-5 of Fig. 1;

10 Fig. 6 is a perspective view of the bristle disk of Fig. 1;

Fig. 7 is a top view of an alternative embodiment of the bristle disk of the present invention; and

15 Fig. 8 is a top view of an alternative embodiment of the bristle disk of the present invention.

#### DETAIL DESCRIPTION OF THE INVENTION

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Referring to the figures and particularly to Fig. 1, a bristle disk generally represented by reference numeral 10 is shown. Disk 10 is a brush that is adapted to be disposed upon and rotatably engage a brush section (not shown). The brush

section can have a first end adapted to engage a handle and a second, opposite end in which disk 10 is received (not shown). Disk 10, when used in conjunction with such a rotary toothbrush, is adapted to clean the teeth and gums of a user by being

5 rotated about axis A shown in Fig. 2.

Referring to Figs. 1 and 2, disk 10 has an annular base 20 with a plurality of tufts 30 of bristles that extend from a bristle side 21 of the base. Base 20 also has a connecting side

10 22. Connecting side 22 has a connectōr (not shown), such as, but not limited to, a press fit coupler, for connecting disk 10 to the second end of the brush section of the toothbrush.

Each tuft 30 has one or more individual bristles. A tuft

15 is a grouping of one or more bristles. A bristle is a single strand, piece or fiber of material. The bristles in each tuft 30 have substantially the same diameter or cross-section. However, it is possible that some bristles of a tuft 30 may have a different cross-section or diameter. While it is preferred

20 that the diameter of each bristle be circular, the bristles can have any geometric shape, such as, for example, a diamond, octagon, and pentagon. Also, the end of each bristle may have an embossment. The embossment may have a variety of patterns or shapes, such as, for example, protrusions or indentations.

In a preferred embodiment, each bristle of each tuft 30 of disk 10 is made of nylon, polyester, or other synthetic materials. Preferably, each bristle is made of nylon or  
 5 polyester.

Tufts 30, and thus the bristles in each tuft, extend from base 20 in rows. Preferably, there are at least three groups of  
 10 tufts 30. These groups of tufts 30 are an outer row 40, a middle row 50 and an inner row 60. More preferably, rows 40, 50, 60 are circumferential. Outer row 40 is intended to clean the gingival space between the teeth and gums. Middle row 50 is intended to clean the surface of the teeth. Inner row 60 is intended to clean the interproximal space between the teeth.

The bristles of each tuft 30 in outer row 40 are arranged such that each tuft is an elongated rectangular tuft 41. Each rectangular tuft 41 includes rounded corners 42, a long side 43 and a short side 44. The rectangular tufts 41 are arranged such  
 20 that long side 43 is approximately perpendicular to the radius of outer row 40, and short side 44 is approximately parallel to the radius of the outer row. As shown in Figs. 2 through 5, all of the bristles of rectangular tufts 41, and therefore all of the tufts in outer row 40, are of substantially the same height.

Thus, outer row 40 is intended to clean the gingival space between the teeth and gums when base 20 is rotated by an electric toothbrush.

5 In a preferred embodiment, outer row 40 has eight rectangular tufts 41. However, any number of rectangular tufts 41 sufficient to clean the gingival space between the teeth and gums is considered within the scope of the present invention.

10 In an alternate embodiment, long sided 43 of rectangular tufts 41 are curved so as to approximate the circumference of outer row 40.

15 Middle row 50 has two types of tufts. These types of tufts are rectangular tufts 51 and circular tufts 55. Middle row 50 includes an equal number of rectangular tufts 51 and circular tufts 55. Moreover, the tufts of middle row 50 alternate along the circumference of the middle row between rectangular tufts 51 and circular tufts 55. In a preferred embodiment, middle row 50 has eight tufts, namely four rectangular tufts 51 and four

20 circular tufts 55. However, any number of alternating rectangular tufts 51 and circular tufts 55 sufficient to clean the surface of the teeth is considered within the scope of the present invention.



Rectangular tufts 51 of middle row 50 include rounded corners 52, a long side 53 and a short side 54. Rectangular tufts 51 are arranged such that long side 53 is approximately parallel to the radius of middle row 50 and short side 54 is approximately perpendicular to the radius of the middle row. Additionally, rectangular tufts 51 have bristles of differing heights, which form a point 56. Point 56 of rectangular tufts 51 is formed along short side 54 closest to middle row 60. Thus as shown in Figs. 2 through 5, rectangular tufts 51 have bristles that vary in height from short side 54 near outer row 40, to the short side near inner row 60 forming a linear slope towards point 56.

Circular tufts 55 have bristles of substantially the same height to one another. Circular tufts 55 have rounded edges. The height of the bristles of circular tufts 55 is less than the height of any bristles in rectangular tufts 41. Thus, middle row 50 is intended to clean the surface of the teeth by providing an alternating circumferential row of rectangular tufts 51 and circular tufts 55 having alternating heights.

Inner row 60 preferably has a single center tuft 61. Tuft 61 is preferably circular. The bristles of center tuft 61 are arranged to form a point 62 in the center of brush disk 10. The

height of the bristles at point 62 and edges 63 of center tuft 61 are larger than the height of any tuft in either the middle row 50 or outer row 40. Thus, inner row 60 is intended to clean the interproximal space between the teeth. In the present invention, each row may assist another row, besides functioning for its intended purpose.

As shown in Fig. 1, rectangular tufts 41 of outer row 40, are circumferentially offset from either rectangular tufts 51 or circular tufts 55 of middle row 50. Thus, tufts 30 are serially offset from a diameter of base 20.

Referring to Fig. 7, an alternative embodiment of the bristle disk is generally represented by reference numeral 10'. Disk 10' has four groups of tufts 30. These groups of tufts 30 are a peripheral row 70, an outer row 40, a middle row 50 and an inner row 60. Preferably, rows 40, 50, 60, 70 are circumferential. The bristles of each tuft 30 in peripheral row 70 are arranged such that each tuft is a substantially circular tuft 71.

Referring to Fig. 8, an alternative embodiment of the bristle disk is generally represented by reference numeral 10''. Disk 10'' has four groups of tufts 30. These groups of tufts 30

are a peripheral row 70', an outer row 40', a middle row 50 and an inner row 60. Preferably, rows 40', 50, 60, 70' are circumferential. The bristles of each tuft 30 in peripheral row 70' are arranged such that each tuft is an elongated rectangular tuft 72. Each rectangular tuft 72 includes rounded corners 73, a long side 74 and a short side 75. The rectangular tufts 72 are arranged such that long side 74 is approximately perpendicular to the radius of peripheral row 70', and short side 75 is approximately parallel to the radius of the peripheral row. The bristles of each tuft 30 in outer row 40' are arranged such that each tuft is a substantially circular tuft 45.

It should be understood that the foregoing description is only illustrative of the present invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances that fall within the scope of the appended claims.